KEMX-5000

Industrial Motherboard in Mini-ITX form factor with Intel® Core™ i3/i5/i7/Celeron processor and HM55 chipset

User's Guide

Contact Info: **Quanmax Inc.**
4F, No. 415, Ti-Ding Blvd. Sec. 2NeiHu District,
Taipei 114Taiwan
Tel: +886-2-2799-2789
Fax: +886-2-2799-7399

Visit our site at: **www.quanmax.com**

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Quanmax reserves the right to make changes without notice in product or component design as warranted by evolution in user needs or progress in engineering or manufacturing technology. Changes which affect the operation of the unit will be documented in the next revision of this user's guide.

Revision	Date	Edited by	Changes
1.0	2010/06/16	Zack	Initial Release
1.1	2011/06/27	Zack	Update Table 35, 36 Figures
1.2	2011/07/21	Zack	Update Block Diagram – 3x SATA, Dual LVDS

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Safety Instructions

■ Before You Begin

Before handling the product, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the “Advisories” section in the Preface for advisory conventions used in this user’s guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating a computer. Only qualified, experienced, authorized electronics service personnel should access the interior of a computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user’s guide for precautions and procedures. If you have any questions, please contact Quanmax Post-Sales Technical Support.

WARNING

High voltages are present inside the chassis when the unit’s power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

■ When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1. Turn off the computer and any peripherals.
2. Disconnect the computer and peripherals from their power sources or subsystems to prevent electric shock or system board damage. This does not apply when hot swapping parts.

3. Follow the guidelines provided in “Preventing Electrostatic Discharge” on the following page.
4. Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

CAUTION

Do not attempt to service the system yourself except as explained in this user’s guide. Follow installation and troubleshooting instructions closely.

■ Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Quanmax strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.
You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component’s antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.
- When transporting a sensitive component, first place it in an antistatic container

or packaging.

- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.
- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

Preface

■ How to Use This Guide

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

NOTE

Driver downloads and additional information are available under Downloads on our web site: www.quanmax.com.

■ Unpacking

When unpacking, follow these steps:

1. After opening the box, save it and the packing material for possible future shipment.
2. Remove all items from the box. If any items listed on the purchase order are missing, notify Quanmax customer service immediately.
3. Inspect the product for damage. If there is damage, notify Quanmax customer service immediately. Refer to “Warranty Policy” for the return procedure.

■ Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices.

FCC Compliance Statement for Class A Devices

The product(s) described in this user’s guide has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user’s guide, may cause harmful interference to radio communications. Operation of this equipment in a residential

area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.
Changes or modifications not expressly approved by Quanmax could void the user's authority to operate the equipment.

NOTE

The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

■ Warranty Policy

Limited Warranty

Quanmax Inc.'s detailed Limited Warranty policy can be found under Support at www.quanmax.com. Please consult your distributor for warranty verification.
The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Quanmax or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Quanmax or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.
No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Quanmax reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

Return Procedure

For any Limited Warranty return, please contact Support at www.quanmax.com and login to obtain a Return Material Authorization (RMA) Number. If you do not have an account, send an email to support@quanmax.com to apply for one.
All product(s) returned to Quanmax for service or credit must be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items must be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty must include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the

date of purchase.
To reduce risk of damage, returns of product must be in a Quanmax shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Quanmax Customer Service at a nominal cost. Quanmax owns all parts removed from repaired products. Quanmax uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Quanmax repairs or replaces a product, its warranty term is not extended.
Shipments not in compliance with this Limited Warranty Return Policy will not be accepted by Quanmax.

Limitation of Liability

In no event shall Quanmax be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Quanmax's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Quanmax or its authorized agent.

■ Maintaining Your Computer

Environmental Factors

- **Temperature**

  The ambient temperature within an enclosure may be greater than room ambient temperature. Installation in an enclosure should be such that the amount of air flow required for safe operation is not compromised. Consideration should be given to the maximum rated ambient temperature. Overheating can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices.
  If the system has been exposed to abnormally cold temperatures, allow a two-hour warm-up period to bring it up to normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.

- **Humidity**

  High-humidity can cause moisture to enter and accumulate in the system. This moisture can cause corrosion of internal components and degrade such

properties as electrical resistance and thermal conductivity. Extreme moisture buildup inside the system can result in electrical shorts, which can cause serious damage to the system.

Buildings in which climate is controlled usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range. Refer to the “Specifications” section of this user’s guide for the operating and storage humidity specifications.

- **Altitude**

  Operating a system at a high altitude (low pressure) reduces the efficiency of the cooling fans to cool the system. This can cause electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

Power Protection

The greatest threats to a system’s supply of power are power loss, power spikes, and power surges caused by electrical storms, which interrupt system operation and/or damage system components. To protect your system, always properly ground power cables and one of the following devices.

- **Surge Protector**

  Surge protectors are available in a variety of types and usually provide a level of protection proportional with the cost of the device. Surge protectors prevent voltage spikes from entering a system through the AC power cord. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

- **Line Conditioner**

  Line conditioners go beyond the over voltage protection of surge protectors. Line conditioners keep a system’s AC power source voltage at a fairly constant level and, therefore, can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors. However, line conditioners cannot protect against a complete loss of power.

- **Uninterruptible Power Supply**

Uninterruptible power supply (UPS) systems offer the most complete protection against variations on power because they use battery power to keep the server running when AC power is lost. The battery is charged by the AC power while it is available, so when AC power is lost, the battery can provide power to the system for a limited amount of time, depending on the UPS system.
UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive unit s allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power let you conduct an orderly shutdown of the system, but are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety approved.

Chapter 1

Introduction

■ Overview

The KEMX-5000 is a Mini-ITX form factor industrial motherboard combining the latest Intel® Core™ i3/i5/i7/Celeron processors with the high integration of the Intel® HM55 chipset. The new architecture of Intel® Core™ i3/i5/i7/Celeron processors enable the lowest power consumption and smallest form factor for thin client and fundamental use. Featured are DDR3-1066/1333 SO-DIMM up to 8GB, 18/24-bit LVDS, HDMI, DVI-D, Compact Flash socket, dual Gigabit Ethernet, three SATA, PCI Express x16 expansion slot, one mini-PCIe, 8x USB 2.0, 6 COM ports with Power Selection, HD audio, and keyboard/mouse. The KEMX-5000 is a compact, high performance industrial motherboard that is ideal for POS, multimedia, gaming, and thin client applications.

Checklist

- Driver/ Manual CD
- Quick Installation Guide
- I/O Shield
- KEMX-5000 main board
- SATA cable x 1
- COM port cable x 1

Features

- Intel® Core™ i3/i5/i7/Celeron
- Intel® HM55
- Supports DVI-D, HDMI, VGA, 18/24-bit LVDS
- Two DDR3 SO-DIMM Socket, total up to 8 GB
- 1x mini PCIe, 1x Compact Flash Socket
- 3x SATA, 8x USB 2.0, 2x GbE
- 6x COM ports, 8 bit in/8 bit out Digital IO Support
- Watchdog Timer, Hardware Monitor

■ Product Specifications

Model Name	KEMX-5000
CPU Support	Intel® Core™ i3/i5/i7/Celeron Processors
Chipset	Intel® HM55
Memory	One double stack SO-DIMM for dual channel DDR3 supported, non-ECC, up to 8GB
BIOS	▪ AMI PnP Flash BIOS ▪ TPM1.2 supported
Display	▪ Integrated fifth generation graphics core. ● One DB-15 connector on rear I/O ● One DVI-D connector on rear I/O ● One HDMI connector on rear I/O ● One 2x20 pins pitch 1.25mm conector (Horng Tong; P/N: WF40H6-B4JA074) for 18/24-bits LVDS supported ● One 7-pins pitch 2.0mm wafer connector for LVDS backlight control supported
LAN	▪ Two Gigabit Ethernet ports supported ● One GbE controller (Intel 82574L) onboard ● One GbE PHY (Intel82577LM) onboard Two RJ-45 connectors w/z Gb transformer (stack with dual USB connectors) on rear I/O
Audio	▪ Realtek ALC888 HD audio codec onboard. ● One audio stack connector for Line-Out, Line-In and Mic-In on rear I/O ● One 4-pins pitch 2.54mm header for SPDIF supported ● One 2x5-pins pitch 2.54mm header for HD front panel audio supported ● One LM4838MTE 2Watts audio amplifier onboard, Gain can be adjust by BIOS Two 2-pins pitch 2.54mm pin headers for Right/Left speaker out
Peripheral Support	▪ Storage supported ● Three 7-pins SATA connectors supported. (Only 1/2/5 work) ● The fifth SATA connector signals share with Mini-PCIe slot (reserved for mSATA supported), and the color of the connector must be different with others. ● One SATA to IDE converter IC onboard for CF supported ● One CF socket supported ▪ Eight USB2.0 ports support ● Four ports stack with two RJ-45 connectors on rear I/O ● Four ports via two 2x5-pins 2.54mm pitch headers for internal. ▪ One 2x9-pins 2.54mm pitch header for 16-bits DIO support ● 8-bits Input and 8-bits Output ▪ One stack connector on rear I/O for PS/2 Keyboard and Mouse ▪ Six COM ports supported ● One DB-9 male connector for COM1 on rear I/O ● Five 2x5-pins pitch 2.0mm box headers for COM2 ~ COM6 ● COM1 with RS422/485 supported

	● COM1 ~ COM6 with +12V & +5V supported, select by jumper. Current guaranty 500mA on each port. ▪ One 1x5-pins pitch 2.54mm header for IrDA support ▪ Buzzer onboard ▪ Two fans supported ● One 4-pin FAN for CPU ● One 3-pin FAN for system ● Fans speed control supported BIOS corruption recovery by H/W, circuit reserved for BOM optional.
Power	▪ One 24-pins standard ATX power connector for power input AT/ATX supported
Battery	▪ One Vertical battery socket onboard Lithium, 3V, CR2032 battery supported
ACPI	ACPI supported – 3.0b
Expansion	▪ One Mini PCIE slot supported ▪ One PCIEx16 slot supported
Watchdog Timer	1-255 step
Hardware Monitor	Supply voltages detection CPU and system temperature detection CPU and system fan speed detection
Dimensions	Mini-ITX (170 x 170 mm), PCB in Blue Color
Environmental Factors	Operation Temp: 0ºC - 60ºC Storage Temp.: -10ºC - 85ºC Humidity: 0% - 90%
Certifications	CE, FCC Class A

Table 1 KEMX-5000 Specification

■ System Block Diagram

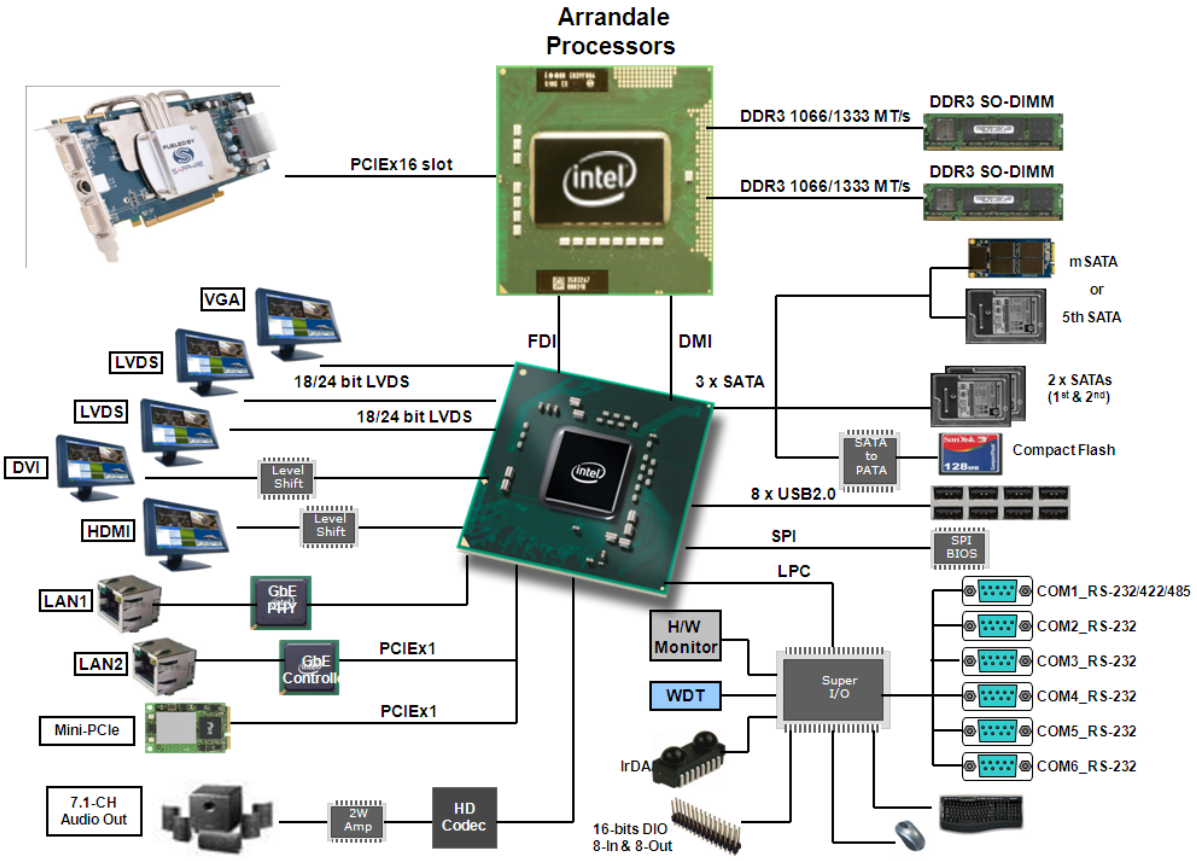


Figure 1 Block Diagram

■ Mechanical Dimensions

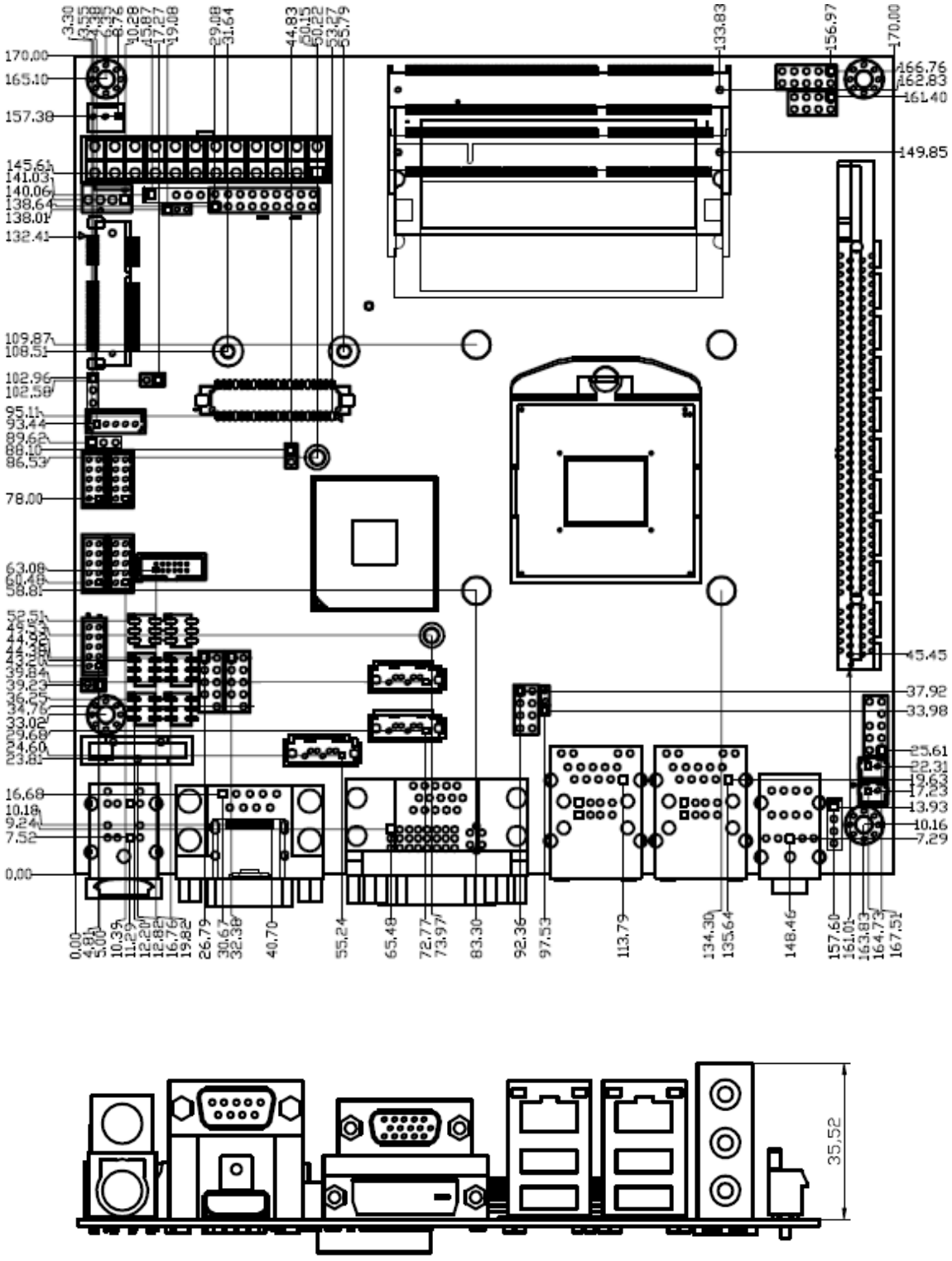


Figure 2 Mechanical Dimensions

Chapter 2

Hardware Settings

■ Overview

This chapter provides the definitions and locations of jumpers, headers, and connectors.

Jumpers

The product has several jumpers which must be properly configured to ensure correct operation.

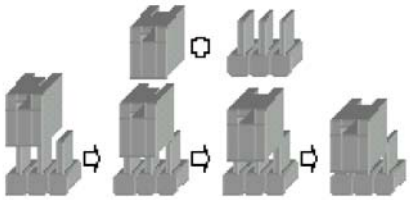


Figure 3 Jumper Connector

For a three-pin jumper (see *Figure 3*), the jumper setting is designated “1-2” when the jumper connects pins 1 and 2. The jumper setting is designated “2-3” when pins 2 and 3 are connected and so on. You will see that one of the lines surrounding a jumper pin is thick, which indicates pin No.1.
To move a jumper from one position to another, use needle-nose pliers or tweezers to pull the pin cap off the pins and move it to the desired position.

■ Jumper Settings and Pin Definitions

For jumper and connector location, please refer to the diagrams below.

Top View

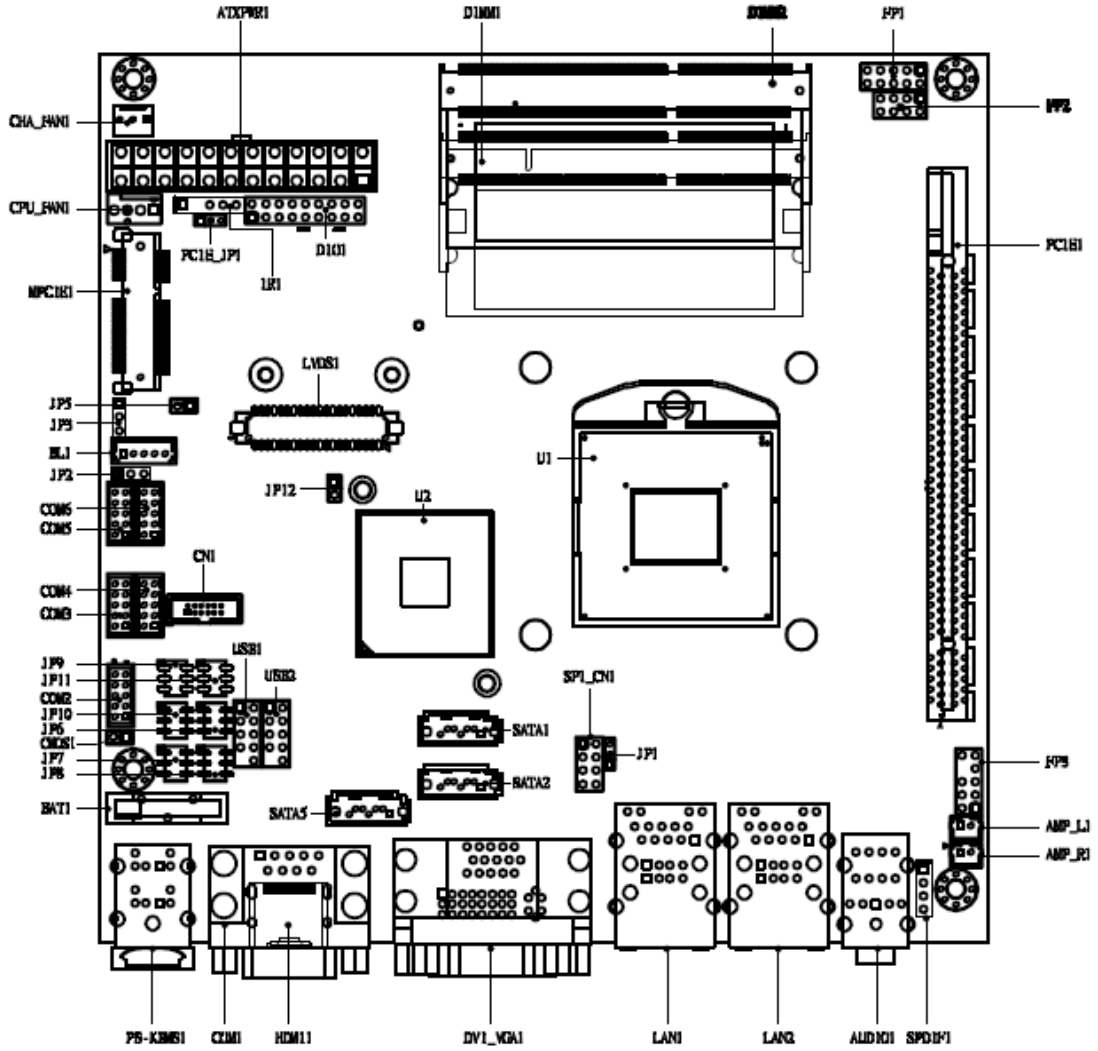


Figure 4 Jumper and Connector Locations – Top View

Bottom View

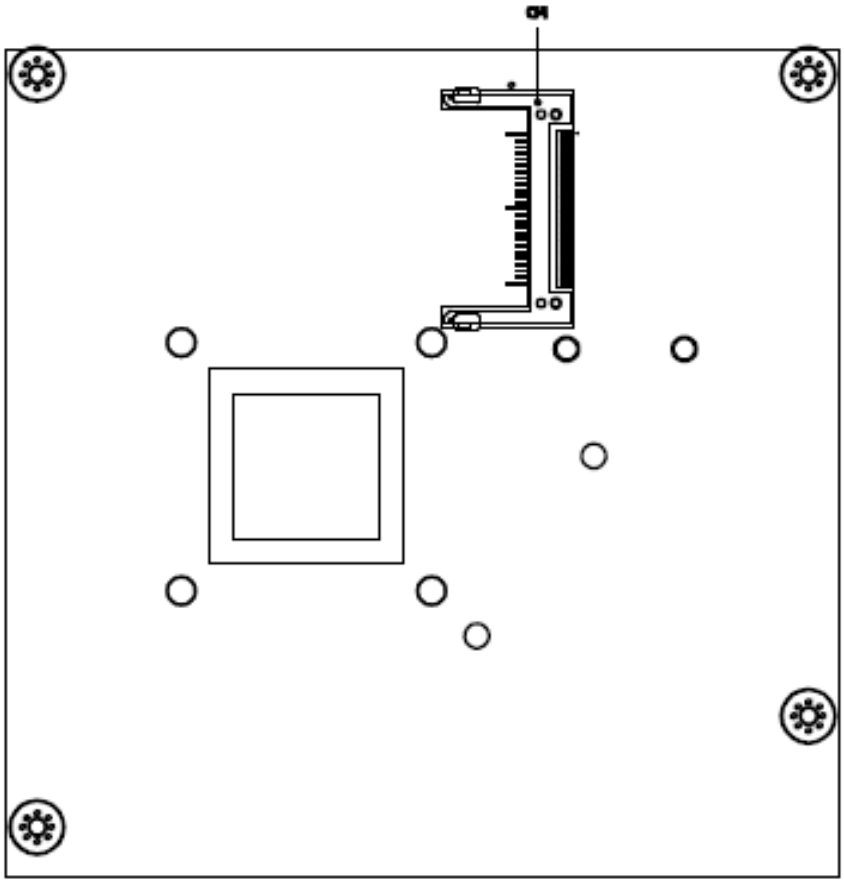


Figure 5 Jumper and Connector Locations – Bottom View

Rear Panel

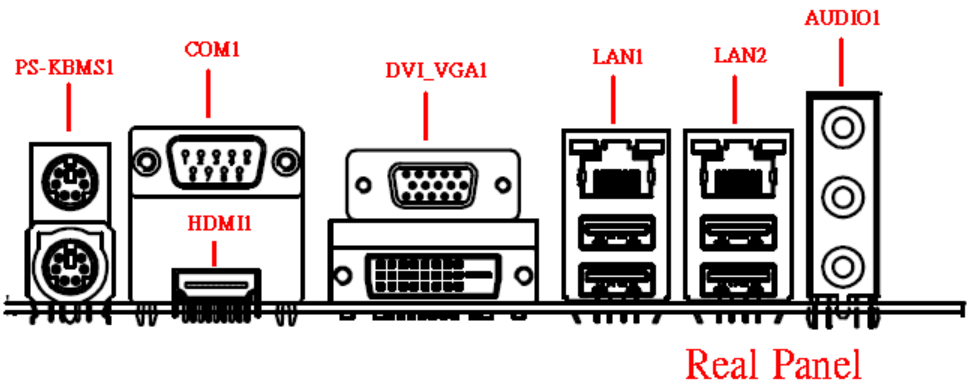


Figure 6 Rear panel IO

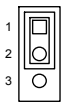
Jumper Settings

To ensure correct system configuration, the following section describes how to set the jumpers to enable/disable or change functions. For jumper descriptions, please refer to the table below.

Table 2 Jumper List

Label	Function
PCIE_JP1	*Mini PCIE Rev1.1 & 1.2 Mode Selection*
COMS1	*Clear CMOS Selection*
JP1	*SPI ROM Selection*
JP2	*Backlight Enable Selection*
JP3	*Backlight Power Selection*
JP5	*Power Mode Selection*
JP6	*COM3 Signal / Power Selection*
JP7	*COM1 Signal / Power Selection*
JP8	*COM2 Signal / Power Selection*
JP9	*COM6 Signal / Power Selection*
JP10	*COM4 Signal / Power Selection*
JP11	*COM5 Signal / Power Selection*
SPI_CN1	*SPI DEBUG PORT*

Table 3 PCIE_JP1 Mini PCIE Version Selection

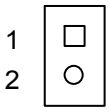


Jumper	Status
1-2	MPCIE Rev1.1
2-3	MPCIE Rev1.2

TYPE Pitch: 2.0mm [YIMTEX 3291*03SAGR (6T)]

- Jumper default (1-2)

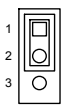
Table 4 COMS1 Clear CMOS Selection



Jumper	Status
Open	Normal Operation
Short	Clear CMOS

Pitch: 2.54mm [YIMTEX 3321*02SAGR (6T))]

Table 5 JP1 SPI ROM Selection

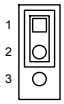


Jumper	Status
1-2	Master SPI ROM
2-3	Slave SPI ROM

TYPE Pitch: 2.0mm [YIMTEX 3291*03SAGR (6T)]

- Jumper default (1-2)

Table 6 JP2 Backlight Enable Selection

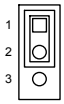


Jumper	Status
1-2	High Active
2-3	Low Active

TYPE Pitch: 2.0mm [YIMTEX 3291*03SAGR (6T)]

- Jumper default (1-2)

Table 7 JP3 Backlight Power Selection

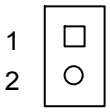


Jumper	Status
1-2	+12V
2-3	+5V

TYPE Pitch: 2.0mm [YIMTEX 3291*03SAGR (6T)]

- Jumper default (1-2)

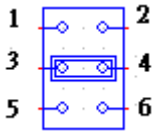
Table 8 JP5 Power mode Selection



Jumper	Status
Open	ATX Mode
Short	AT Mode

Pitch: 2.54mm [YIMTEX 3321*02SAGR (6T))]

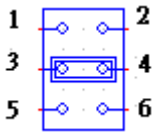
Table 9 JP6 COM3 Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM3 = +12V
3-4	Pin 9 of COM3 = RI
5-6	Pin 9 of COM3 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

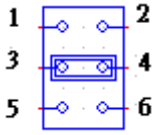
Table 10 JP7 COM1 Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM1 = +12V
3-4	Pin 9 of COM1 = RI
5-6	Pin 9 of COM1 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

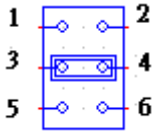
Table 11 JP8 COM2 Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM2 = +12V
3-4	Pin 9 of COM2 = RI
5-6	Pin 9 of COM2 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

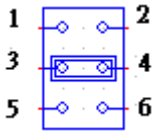
Table 12 JP9 COM6 Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM6= +12V
3-4	Pin 9 of COM6 = RI
5-6	Pin 9 of COM6 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

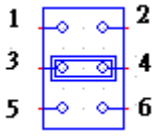
Table 13 JP10 COM4Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM4 = +12V
3-4	Pin 9 of COM4 = RI
5-6	Pin 9 of COM4 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

Table 14 JP11 COM5 Signal / Power Selection



Jumper	Status
1-2	Pin 9 of COM5 = +12V
3-4	Pin 9 of COM5 = RI
5-6	Pin 9 of COM5 = +5V

Pitch: 2.0mm [PINREX 222-97-03GBB1]

Rear Panel Pin Assignments

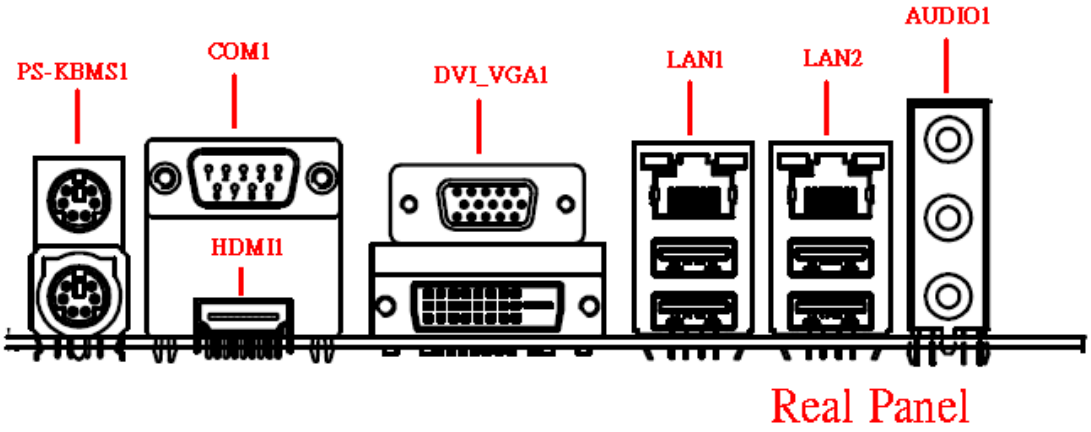
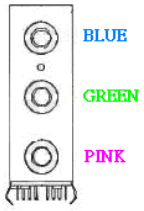


Figure 7 Rear Panel IO

Table 15 Rear Panel Connector List

Label	Function
PS-KBMS1	*PS/2 KB/MS Mini-DIN Connector*
DVI_VGA1	*DVI & VGA Connector*
HDMI1	*HDMI1 connector*
LAN1	*10/100/1000 Ethernet RJ-45 Connector*
LAN2	*10/100/1000 Ethernet RJ-45 Connector*
COM1	*RS-232 / 422 / 485 Port DB-9 Connector*
AUDIO1	*3-Port Audio phone jack*

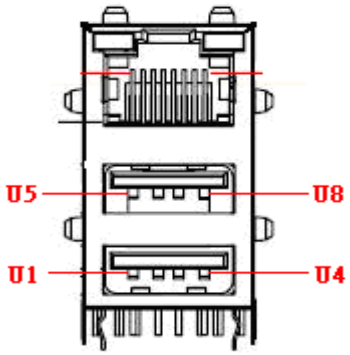
Table 16 AUDIO1 3 Stack-up Azalia Audio Phone Jack



	Signal Name
BLUE	LINE IN
GREEN	LINE OUT
PINK	MIC IN

[Foxconn JA33331-H11P-4F]

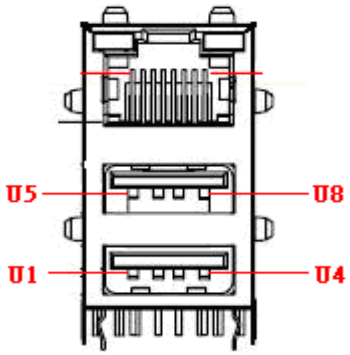
Table 17 LAN1 RJ-45 + USB Port-0&1 Connector



Pin	Signal	Pin	Signal
1	VCC	12	Yellow LED
2	D0+	13	Green LED#
3	D0-	14	Orange LED#
4	D1+	U1	USB_PWR
5	D1-	U2	USB_N0
6	D2+	U3	USB_P0
7	D2-	U4	GND
8	D3+	U5	USB_PWR
9	D3-	U6	USB_N1
10	GND	U7	USB_P1
11	Yellow LED#	U8	GND

USB*2/RJ45*1+TFM+LED(10/100/1000)22P DIP 90° [UDE RU1-161F9WGF(XB)]

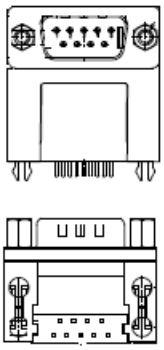
Table 18 LAN2 RJ-45 + USB Port-2&3Connector



Pin	Signal	Pin	Signal
1	VCC	12	Yellow LED
2	D0+	13	Green LED#
3	D0-	14	Orange LED#
4	D1+	U1	USB_PWR
5	D1-	U2	USB_N2
6	D2+	U3	USB_P2
7	D2-	U4	GND
8	D3+	U5	USB_PWR
9	D3-	U6	USB_N3
10	GND	U7	USB_P3
11	Yellow LED#	U8	GND

USB*2/RJ45*1+TFM+LED(10/100/1000)22P DIP 90° [UDE RU1-161F9WGF(XB)]

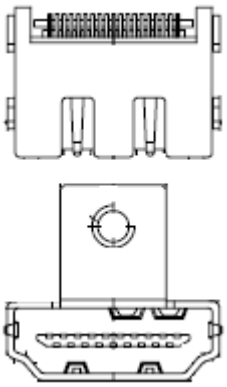
Table 19 COM1 RS-232 DB-9 Connector



Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

D-SUB 9P 90D (M) with hexagonal screws [FEN YING D20H1P00B112AE31N0]

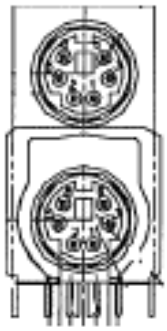
Table 20 HDMI1 Connector



Signal Name	Pin	Pin	Signal Name
TMD_DATA2+	1	2	GND
TMD_DATA2-	3	4	TMD_DATA1+
GND	5	6	TMD_DATA1-
TMD_DATA0+	7	8	GND
TMD_DATA0-	9	10	HDMI_TCLP
GND	11	12	HDMI_TCLN
NC	13	14	NC
DDC_CLK	15	16	DDC_DATA
GND	17	18	+5V
HPDET	19		

HDMI right angle with screw hole, SMD 90° 19pin [WIN WIN WHDM-19F3L1BF3U4]

Table 21 PS-KBMS1 Internal PS/2 Keyboard & Mouse



Pin	Signal Name	Pin	Signal Name
1	KB_DATA	2	NC
3	GND	4	KB_PWR
5	KB_CLK	6	NC
7	MS_DATA	8	NC
9	GND	10	KB_PWR
11	MS_CLK	12	NC
13	GND	14	GND
15	GND	16	GND

DIP 6/6P MH11061-P36-4F 90D (F) Kb/Ms for PC99 CONNECTOR [FOXCONN]

Main Board Pin Assignments

Internal Connector List

Table 22 Internal Connector List

Label	Function
DIMM1	*DDR3 Memory SO-DIMM Socket*
DIMM2	*DDR3 Memory SO-DIMM Socket*
CPU_FAN1	*CPU FAN Wafer*
CHA_FAN1	*SYSTEM FAN Wafer*
MPCIE1	*PCIE x 1 Slot*
IR1	*rDA Pin Header*
LVDS1	*LVDS Panel Pin Header*
BL1	*Panel Backlight Wafer*
ATXPWR1	*24-pin ATX Power Input Connector*
CN1	*Debug port Connector*
COM2	*RS-232 Port 2 Box Header*
COM3	*RS-232 Port 3 Box Header*
COM4	*RS-232 Port 4 Box Header*
COM5	*RS-232 Port 5 Box Header*
COM6	*RS-232 Port 6 Box Header*
SATA1	*Serial ATA Connector*
SATA2	*Serial ATA Connector*
SATA3	*Serial ATA Connector (not connected)*
SATA4	*Serial ATA Connector (not connected)*
SATA5	*Serial ATA Connector (The fifth SATA connector signals share with Mini-PCIe slot,)*
USB1	*USB2.0 Port 4, 5 Pin Header*
USB2	*USB2.0 Port 8, 9 Pin Header*
AMP_L1	*Left Channel 2W Audio AMP Output Wafer*
AMP_R1	*Right Channel 2W Audio AMP Output Wafer*
BAT1	*CR2032 Battery Holder*
PCIE1	*PCIExpress X16 Slot*
SPDIF1	*S/PDIF Pin Header*
DIO1	*16-bits DIO Connector (8-bits Input and 8-bits Output)*
BZ1	*Buzzer*
FP1	*Front Panel Audio Pin Header*
FP2	*Front Panel 2 Pin Header*
FP3	*Front Panel 3 Pin Header*
CF1	*CF socket*

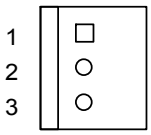
Table 23 DIMM 1&2 DDR3 Memory SO-DIMM Slot
DDR3 1.5V High=5.2mm STD Type [ARGOSY DDRSK-20401-TP5B]

Table 24 CPU_FAN1 CPU FAN Wafer

Pin	Signal
1	GND
2	+12V
3	FAN_CPU_TACH
4	FAN_CPU_CTRL

Pitch: 2.54mm FOXCONN HF2704E-M1

Table 25 CHA_FAN1 SYSTEM FAN Wafer



Pin	Signal
1	GND
2	+12V
3	HW_FANIN1

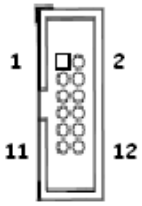
P-2.54mm WAFER [YIMTEX 521AW1*03STR]

Table 26 IR1 IrDA remote control Wafer

Pin	Signal Name
1	+5v
2	NC
3	IRRX
4	GND
5	IRTX

Pitch: 2.54mm [YIMTEX 3321*05SAGR(6T)-02]

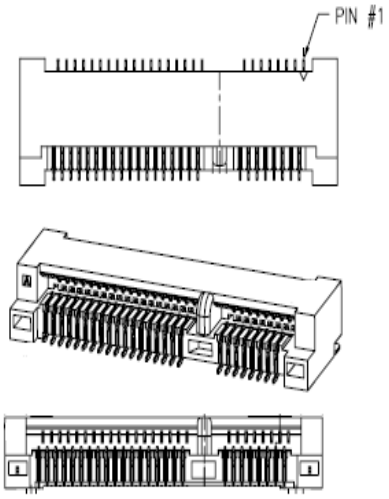
Table 27 CN1 LPC Box Header



Pin	Signal	Pin	Signal
1	+3.3V	2	GND
3	GND	4	LPC_LAD3
5	LPC_RST#	6	LPC_LAD2
7	CLK33_LPC	8	LPC_LAD1
9	LPC_FRAME#	10	LPC_LAD0
11	SERIEQ	12	LPC_LDRQ1

Pitch: 1.27 mm [YIMTEX 327A121SAG (6T)]

Table 28 MPCIE1 Mini PCIe Connector



Signal	Pin	Pin	Signal
WAKE#	1	2	+3.3V
Reserved	3	4	Ground
Reserved	5	6	+1.5V
CLKEQ#	7	8	UIM_PWR
Ground	9	10	UIM_DATA
REFCLK-	11	12	UIM_CLK
REFCLK+	13	14	UIM_RESET
Ground	15	16	UIM_VPP
Reserved	17	18	Ground
Reserved	19	20	W_disable#
Ground	21	22	PERST#
PERn0	23	24	+3VSB
PERp0	25	26	Ground
Ground	27	28	+1.5V
Ground	29	30	SMB_CLK
PETn0	31	32	SMB_DATA
PETp0	33	34	Ground
Ground	35	36	USB_D-
Reserved	37	38	USB_D+
Reserved	39	40	Ground
Reserved	41	42	LED_WWAN#
Reserved	43	44	LED_WAN#
Reserved	45	46	LED_WPAN#
Reserved	47	48	+1.5V
Reserved	49	50	Ground
Reserved	51	52	+3.3V

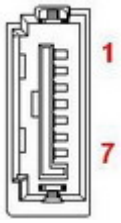
MINI PCI-Express Connector [FOXCONN AS0B226-S56N-7F]

Table 29 SATA1, SATA2 Serial ATA Connector

Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

SATA CONNECTOR BLUE [FOXCONN LD1807V-S52U]

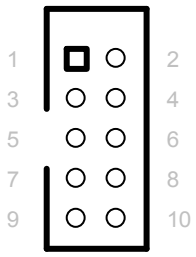
Table 30 SATA5 Serial ATA Connector



Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

SATA CONNECTOR BLACK WATM-07ABN4B2B8UW

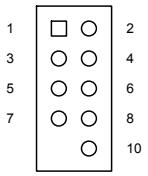
Table 31 COM2,COM3,COM4,COM5,COM6 RS-232 Box Header



Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	NC

DIP 10P 2R 180° Pitch: 2.0mm WAFER [Chyao-Shiunn JS-2008A-2x05-HK]

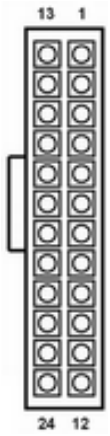
Table 32 USB1,USB2 USB Pin Header



Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB2-	4	USB3-
5	USB2+	6	USB3+
7	GND	8	GND
9	KEY	10	GND

Pitch: 2.54mm [YIMTEX 3322*05SAGR (6T) -09]

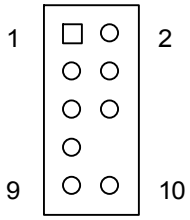
Table 33 ATXPWR1 24-pin ATX Power Input Connector



Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	POWER OK	20	-5V
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Pitch: 3.96mm [YIMTEX 576MWA2*12STR]

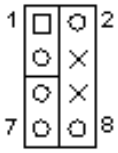
Table 34 FP3 Digital Input / Output Pin Header



Pin	Signal	Pin	Signal
1	MIC_L	2	GND
3	MIC_R	4	ACZ_DET#
5	LIN_R	6	MIC_JD
7	SENSE	8	NC
9	LIN_L	10	LINE_JD

Pitch: 2.0mm [YIMTEX 3292*05SAGR (6T)]

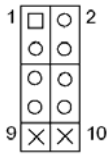
Table 35 FP2 Front Panel 2 Pin Header



Pin	Signal	Pin	Signal
1	Keyboard Lock	2	Speaker +
3	GND	4	NC
5	SMBus Data	6	NC
7	SMBus Clock	8	Speaker -

Pitch: 2.54mm [YIMTEX 3322*04SAGR (6T)]

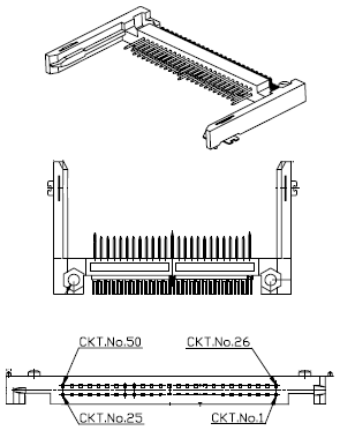
Table 36 FP1 Front Panel 1 Pin Header



Pin	Signal	Pin	Signal
1	HDD LED +	2	Power LED +
3	HDD LED -	4	Power LED -
5	Reset Button +	6	Power Button +
7	Reset Button -	8	Power Button -
9	NC	10	NC

Pitch: 2.54mm [YIMTEX 3322*05SAGR (6T]

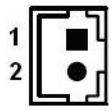
Table 37 CF1 CF Type II Connector



Signal Name	Pin	Pin	Signal Name
GND	1	26	GND
IDE Data 3	2	27	IDE Data 11
IDE Data 4	3	28	IDE Data 12
IDE Data 5	4	29	IDE Data 13
IDE Data 6	5	30	IDE Data 14
IDE Data 7	6	31	IDE Data 15
IDE Chip select 1#	7	32	IDE Chip select 3#
GND	8	33	GND
GND	9	34	IDEIOR#
GND	10	35	IDEIOW#
GND	11	36	+5V
GND	12	37	IDEIRQ
+5V	13	38	+5V
GND	14	39	PCSEL
GND	15	40	NC
GND	16	41	Reset IDE
GND	17	42	IDEIORDY
SDA2	18	43	DREQ
IDE Address 1	19	44	DACK#
IDE Address 0	20	45	IDE activity
IDE Data 0	21	46	PDIAG#
IDE Data 1	22	47	IDE Data 8
IDE Data 2	23	48	IDE Data 9
IOIS16#	24	49	IDE Data 10
GND	25	50	GND

SMD MALE 50P 90D 2R stand-off 0mm, Standard type [SUNLIT 60303020]

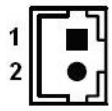
Table 38 AMP_R1 Audio AMP Right Output Wafer



Pin	Signal Name
1	Speaker+
2	Speaker-

Pitch=2.0mm WAFER [YIMTEX 503PW1*02STR]

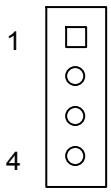
Table 39 AMP_L1 Audio AMP Left Output Wafer



Pin	Signal Name
1	Speaker+
2	Speaker-

Pitch=2.0mm WAFER [YIMTEX 503PW1*02STR]

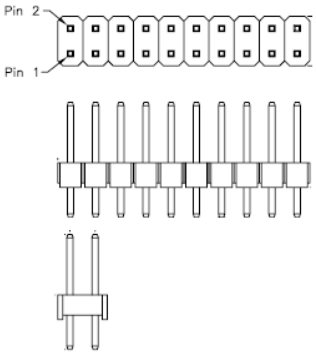
Table 40 SPDIF1 S/PDIF Pin Header



Pin	Signal Name
1	S/PDIF In
2	GND
3	S/PDIF Out
4	GND

P-2.54mm [YIMTEX 3321*04SAGR (6T)]

Table 41 DIO1 Digital Input / Digital Output Pin Header



Pin	Signal	Pin	Signal
1	+5V	2	GND
3	DO0	4	DI0
5	DO1	6	DI1
7	DO2	8	DI2
9	DO3	10	DI3
11	DO4	12	DI4
13	DO5	14	DI5
15	DO6	16	DI6
17	DO7	18	DI7

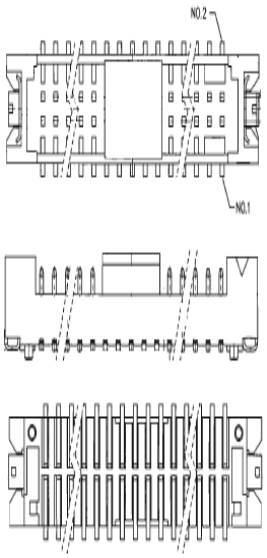
DIP 18P 2R MALE STRAIGHT TYPE Pitch: 2.54mm [PINREX 210-92-09GB01]

Table 42 BL1 LVDS Backlight Inverter Wafer

Pin	Signal Name
1	Backlight Control
2	GND
3	Backlight Power
4	Backlight Power
5	Backlight Enable

Pitch: 2.0mm [YIMTEX 503PW1*07STR]

Table 43 LVDS1 Channel 1 LVDS Connector



Pin	Signal Name	Pin	Signal Name
1	+3.3V	2	+5V
3	+3.3V	4	+5V
5	DDC_CLK	6	DDC_DATA
7	GND	8	GND
9	LVDS0_DATA1	10	LVDS0_DATA0
11	LVDS0_DATA#1	12	LVDS0_DATA#0
13	GND	14	GND
15	LVDS0_DATA3	16	LVDS0_DATA2
17	LVDS0_DATA#3	18	LVDS0_DATA#2
19	GND	20	GND
21	LVDS1_DATA1	22	LVDS1_DATA0
23	LVDS1_DATA#1	24	LVDS1_DATA#0
25	GND	26	GND
27	LVDS1_DATA3	28	LVDS1_DATA2
29	LVDS1_DATA#3	30	LVDS1_DATA#2
31	GND	32	GND
33	LVDS1_CLK	34	LVDS0_CLK
35	LVDS1_CLK#	36	LVDS0_CLK#
37	GND	38	GND
39	+12V	40	+12V

Pitch: 1.25mm [HOMETOM WF40H6-7GJA074]

Chapter 3

System Installation

■ Expansive Interfaces

mini PCIe x1 slot

CF

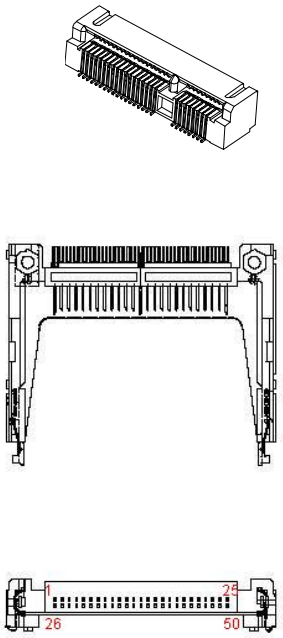


Figure 8 Expansive Interfaces

NOTE

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

■ Memory Module Installation

Carefully follow the steps below in order to install the SO-DIMM:

1. To avoid generating static electricity and damaging the SO-DIMM, ground yourself by touching a grounded metal surface or use a ground strap before you touch the SO-DIMM.
2. Do not touch the connectors of the SO-DIMM. Dirt or other residue may cause a malfunction.
3. Hold the SO-DIMM with its notch aligned with the memory socket of the board and insert it at a 30-degree angle into the socket.

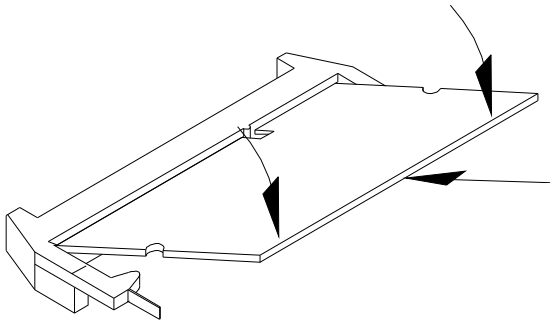


Figure 9 Align the SO-DIMM Memory Module with the onboard socket

4. Fully insert the module into the socket until a “click” is heard.
5. Press down on the SO-DIMM so that the tabs of the socket lock on both sides of the module

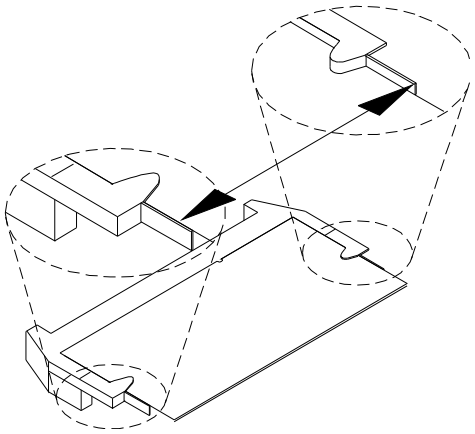


Figure 10 Press down on the SO-DIMM Memory Module to lock it in place

Removing a SO-DIMM:

To remove the SO-DIMM, use your fingers or a small screwdriver to carefully push away the tabs that secure either side of the SO-DIMM. Lift it out of the socket.

Make sure you store the SO-DIMM in an anti-static bag. The socket must be populated with memory modules of the same size and manufacturer.

Chapter 4

AMI BIOS Setup

■ Overview

This chapter provides a description of the AMI BIOS. The BIOS setup menus and available selections may vary from those of your product. For specific information on the BIOS for your product, please contact Quanmax.

NOTE: The BIOS menus and selections for your product may vary from those in this chapter. For the BIOS manual specific to your product, please contact Quanmax

AMI's ROM BIOS provides a built-in Setup program, which allows the user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will not need to be changed unless there is a configuration change in the system, such as a hard drive replacement or when a device is added.

It is possible for the CMOS battery to fail, which will cause data loss in the CMOS only. If this happens you will need to reconfigure your BIOS settings.

■ Main Menu

The BIOS Setup is accessed by pressing the DEL key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins. Once you enter the BIOS Setup Utility, the Main Menu will appear on the screen. The Main Menu provides System Overview information and allows you to set the System Time and Date. Use the “<” and “>” cursor keys to navigate between menu screens.

Table 44 BIOS Main Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
BIOS Information				Set the Date. Use Tab to switch between Data elements.
Version		V1.00		
Build Date		12/24/2010		Use [+] or [-] to configure system Time.
CPU Information				
Intel® Core ™ i5 CPU		M 520 @ 2.40 GHz		
Microcode Revision		9		→ ← Select Screen
Processor Cores		2		↑↓ Select Item
Memory Information				Enter: Select
Total Memory		1024 MB (DDR3 1066)		+- Change Opt.
System Date		[Tue 12/28/2010]		F1: General Help
System Time		[15:42:50]		F2: Previous Values
				F3: Optimized Defaults
				F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

■ Advanced Menu

Table 45 Advanced Menu

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
Onboard LAN 1 Controller	[Enabled]			
Onboard LAN 2 Controller	[Enabled]			
Launch PXE OpROM	[Disabled]			
Audio Controller	[Enabled]			
Audio Amplifier	[2.5 V]			
Keyboard Lock	[Disabled]			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
>Trusted Computing				
>CPU Configuration				
>Display Configuration				
>Power Management Configuration				
>North Bridge				
>South Bridge				
>SATA Configuration				
>Intel TDT(AT-p) Configurations				
>Intel TXT(LT) Configuration				
>USB Configuration				
>Super IO Configuration				
>HW Monitor				
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Press <Enter> to select a sub-menu for detailed options.

Audio Amplifier

Options: 0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V.

Trusted Computing

TPM Support Options: Disable, Enable

Table 46 Advanced Menu – CPU Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
CPU Configuration				Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology). And Disabled for other OS (OS not optimized for Hyper-Threading Technology) When Disabled only one thread per enabled core is enabled.	
Intel® Core™ i5 CPU	M520 @ 2.4GHz				
EMT64	Supported				
Processor Speed	2394 MHz				
Processor Stepping	20652				
Microcode Revision	9				
Processor Cores	2				
Intel HT technology	Supported				
Hyper-threading	[Enabled]			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Active Processor Cores	[All]				
Limit CUPID Maximum	[Disabled]				
Hardware Prefetcher	[Enabled]				
Adjacent Cache Line Prefetch	[Enabled]				
Intel Virtualization Technology	[Enabled]				
Power Technology	[Custom]				
EIST	[Enabled]				
Turbo Mode	[Enabled]				
P-State Coordination	[HW_ALL]				
CPU C3 Report	[Disabled]				
CPU C6 Report	[Disabled]				
Package C State Limit	[No Limit]				
TDC Limit	0				
TDP Limit	0				
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Hyper-threading

Options: Disabled, Enabled

Active Processor Cores

Options: All, 1, 2

Limit CPUID Maximum

Options: Disabled, Enabled

Hardware Prefetcher

Options: Disabled, Enabled

Adjacent Cache Line Prefetch

Options: Disabled, Enabled

Intel Virtualization Technology

Options: Disabled, Enabled

Power Technology

Options: Disable, Energy Efficient, Custom

EIST

Options: Disabled, Enabled

Turbo Mode

Options: Disabled, Enabled

P-STATE Coordination

Options: HW_ALL, SW_ALL, SW_ANY

CPU C3 Report

Options: Disabled, ACPI C-2, ACPI C-3

CPU C6 Report

Options: Disabled, Enabled

Package C State Limit

Options: C0, C1, C3, C6, C7, No Limit

Table 47 Advanced Menu – Display Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
IGD Memory		[32M]		IGD Share Memory Size	
DVMT/FIXED Memory		[256MB]			
IGD – Boot Type		[VBIOS Default]			
LCD Panel Type		[VBIOS Default]			
Panel Backlight Voltage		[2.5 V]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

IGD Memory

Options: Disabled, 32M, 64M, 128M

DVMT/FIXED Memory

Options: 128MB, 256MB, Maximum

IGD – Boot Type

Options: VBIOS Default, CRT, LVDS, CRT + LVDS

LCD Panel Type

Options: VBIOS Default, 640 x 480 18 Bit, 800 x 600 18 Bit, 1024 x 768 18 Bit, 1024 x 768 24 Bit, 1280 x 1024 24 Bit, 1366 x 768 24 Bit, 1400 x 1050 18 Bit, 1440 x 900 24 Bit, 1600 x 1200 24 Bit, 1280 x 768 24 Bit, 1680 x 1050 18 Bit, 1680 x 1050 24 Bit, 1920 x 1080 24 Bit, 1920 x 1200 24 Bit, 1280 x 800 18 Bit, 1280 x 600 18 Bit.

Panel backlight Voltage

Options: 0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V.

Table 48 Advanced Menu – Power Management Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
ACPI Sleep State		[S3 (suspend to R…]		Select the highest ACPI sleep state the system will enter, when the SUSPEND button is pressed.
Restore AC Power Loss		[Power Off]		
Wake System with Fixed Time		[Disabled]		
Wake System with Dynamic Time		[Disabled]		
PS/2 Wake Up		[Disabled]		
				→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

ACPI Sleep State

Options: Suspend Disabled, S1 (CPU Stop Clock), S3 (Suspend to RAM)

Restore AC Power Loss

Options: Power Off, Power On, Last State

Wake System with Fixed time

Options: Disabled, Enabled

Wake System with Dynamic Time

Options: Disabled, Enabled

PS/2 Wake Up

Options: Disabled, Enabled

Table 49 Advanced Menu – North Bridge

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Memory Information				Low MMIO resources align at 64MB/1024MB	
CPU Type		Core™ i 3/i5/i 7/Celeron			
Total Memory		1024 MB DDR3 1066)			
Memory Slot0		0 MB (DDR3 1066)			
Memory lot1		1024 MB (DDR3 1066)			
CAS# latency(tCL)	8				
RAS# Active Time(tRPAS)	20				
Row Precharge Time(tRP)	8				
RAS# to CAS# Delay(tRCD)	8				
Write Recovery Time	8				
Row Refresh Cycle Timea(tRFC)	60				
Write to Read Delay(tWTR)	4				
Active to Active Delay(tRRD)	4				
Read CAS# Precharge(tRTP)	5				
Low MMIO Align	[64M]			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Initiate Graphic Adapter	[PEG/IGD]				
Graphics Turbo IMON Current	31				
VT-d	[Disabled]				
PCI Express Compliance Mode	[Disabled]				
PCI Express Port	[Auto]				
PAVP Mode	[Disabled]				
PEG Force Gen1	[Disabled]				
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Low MMIO Align

Options: 64M, 1024M

Initiate Graphic Adapter

Options: IGD, PCI/IGD, PCI/PEG, PEG/IGD, PEG/PCI

Graphics Turbo IMON Current

Options: 31 only

VT-d

Options: Disabled, Enabled

PCI Express Compliance Mode

Options: Disabled, Enabled

PCI Express Port

Options: Disabled, Enabled, Auto

PAVP Mode

Options: Disabled, Enabled

PEG Force Gen1

Options: Disabled, Enabled

Table 50 Advanced Menu – South Bridge

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
SB Chipset Configuration				SMBus Controller help.	
SMBus Controller	[Enable]				
Onboard LAN 1 Controller	[Enable]				
Wake on LAN from S5	[Enable]				
SLP_S4 Assertion Stretch Enable	[Enable]				
SLP_S4 Assertion Width	[4-5 Seconds]				
Audio Configuration				→ ← Select Screen	
Audio Controller	[Enabled]			↑↓ Select Item	
Azalia Internal HDMI Codec	[Enable]			Enter: Select	
				+- Change Opt.	
High Precision Event Timer Configuration				F1: General Help	
High Precision Timer	[Enabled]			F2: Previous Values	
				F3: Optimized Defaults	
				F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

SMBus Controller

Options: Disable, Enable

Onboard LAN 1 Controller

Options: Disable, Enable

Wake on LAN from S5

Options: Disable, Enable

SLP_S4 Assertion Stretch Enable

Options: Disable, Enable

SLP_S4 Assertion Width

Options: 1-2 Seconds, 2-3 Seconds, 3-4 Seconds, 4-5 Seconds

Audio Controller

Options: Disabled, Enabled

Azalia Internal HDMI Codec

Options: Disable, Enable

High Precision Timer

Options: Disabled, Enabled

Table 51 Advanced Menu – SATA Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
SATA Configuration				
SATA Port1		Not Present		
SATA Port2		Not Present		
SATA Port5		Not Present		
CF Card		Not Present		→ ← Select Screen
				↑↓ Select Item
				Enter: Select
SATA Mode		[IDE Mode]		+- Change Opt.
				F1: General Help
				F2: Previous Values
				F3: Optimized Defaults
				F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

IDE Mode

Options: Disable, IDE Mode, AHCI Mode, RAID Mode

Table 52 Advanced Menu – Intel TDT (AT-p) Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
Intel Theft Deterrence technology Configuration TDT [Disabled] TDT recovery 3				Enable/Disable TDT in BIOS for testing only. → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

TDT

Options: Disabled, Enabled

Table 53 Advanced Menu – Intel TXT (LT) Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
Intel Trusted Execution Technology Configuration SMX Feature Support: [Disabled] Intel TXT(LT) Support [Disabled]				→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Intel TXT (LT) Support

Options: Disabled, Enabled

Table 54 Advanced Menu – USB Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
USB Configuration USB Devices: 1 Keyboard, 1 Mouse, 2 Hubs Legacy USB Support [Enabled] Device Reset timeout [20 sec]				Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Legacy USB Support

Options: Enabled, Disabled, Auto

Device Reset Timeout

Options: 10 sec, 20 sec, 30 sec, 40 sec

Table 55 Advanced Menu – Super IO Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
Super IO Configuration >Serial Port 1 Configuration >Serial Port 2 Configuration >Serial Port 3 Configuration >Serial Port 4 Configuration >Serial Port 5 Configuration >Serial Port 6 Configuration				Set Parameters of Serial Port 1 (COMA) → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Table 56 Advanced Menu – Super IO Configuration – Serial Port 1 Configuration

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
Serial Port 1 Configuration Serial Port Device Settings Change Settings Serial Port 1 Type	 [Enabled] IO=3F8h; IRQ=4; [AUTO] [RS232]			Enable or Disable Serial Port (COM) → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=3F8h; IRQ=4; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 1 Type

Options: RS232, RS422, RS485

Table 57 Advanced Menu – Super IO Configuration – Serial Port 2 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Serial Port 2 Configuration				Enable or Disable Serial Port (COM)	
Serial Port		[Enabled]			
Device Settings		IO=2F8h; IRQ=3;			
Change Settings		[AUTO]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=2F8h; IRQ=3; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Table 58 Advanced Menu – Super IO Configuration – Serial Port 3 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Serial Port 3 Configuration				Enable or Disable Serial Port (COM)	
Serial Port		[Enabled]			
Device Settings		IO=3E8h; IRQ=7;			
Change Settings		[AUTO]			
Device Mode		[Standard Serial…]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=3E8h; IRQ=7; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h;

IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Device Mode

Options: Standard Serial Port Mode, IrDA 1.0 (HP SIR) Mode

Table 59 Advanced Menu – Super IO Configuration – Serial Port 4 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Serial Port 4 Configuration				Enable or Disable Serial Port (COM)	
Serial Port		[Enabled]			
Device Settings		IO=2E8h; IRQ=5;			
Change Settings		[AUTO]			
Device Mode		[Standard Serial…]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=2E8h; IRQ=7; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Device Mode

Options: Standard Serial Port Mode, IrDA 1.0 (HP SIR) Mode

Table 60 Advanced Menu – Super IO Configuration – Serial Port 5 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Serial Port 5 Configuration				Enable or Disable Serial Port (COM)	
Serial Port		[Enabled]			
Device Settings		IO=2F0h; IRQ=10;			
Change Settings		[AUTO]			
Device Mode		[Standard Serial…]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.					

Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=2E0h; IRQ=7; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Device Mode

Options: Standard Serial Port Mode, IrDA 1.0 (HP SIR) Mode

Table 61 Advanced Menu – Super IO Configuration – Serial Port 6 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Boot	Security	Save & Exit	
Serial Port 6 Configuration				Enable or Disable Serial Port (COM)	
Serial Port		[Enabled]			
Device Settings		IO=2E0h; IRQ=6;			
Change Settings		[AUTO]			
Device Mode		[Standard Serial…]		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit	
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Serial Port

Options: Enabled, Disabled

Change Settings

Options: Auto, IO=2F0h; IRQ=7; IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12; IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Device Mode

Options: Standard Serial Port Mode, IrDA 1.0 (HP SIR) Mode

Table 62 Advanced Menu – H/W Monitor

BIOS SETUP UTILITY				
Main	**Advanced**	Boot	Security	Save & Exit
PC Health Status				
CPU Warning Temperature		[Disabled]		
CPU Shutdown Temperature		[Disabled]		
CPU Smart FAN		[Enabled]		
CPU Temperature Off Limit		20		
CPU Temperature Start Limit		40		
CPU Temperature Full Limit		55		
CPU Start PWM		70		
CPU Start FAN SLOPE		[0.5 PWM]		
CPU temperature		: +32 C		
System temperature		: +32 C		
CPU FAN Speed		: N/A		→ ← Select Screen
SYS FAN Speed		: N/A		↑↓ Select Item
VCORE		: +1.104 V		Enter: Select
1.5V		: +1.568 V		+- Change Opt.
5V		: +5.068 V		F1: General Help
VCC		: +3.361 V		F2: Previous Values
12V		: +11.904 V		F3: Optimized Defaults
VBAT		: +1.624 V		F4 Save ESC Exit
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CPU Warning Temperature

Options: Disabled, 80 C, 85 C, 90 C, 95 C

CPU Shutdown Temperature

Options: Disabled, 80 C, 85 C, 90 C, 95 C

CPU Smart FAN

Options: Enabled, Disabled

CPU Smart FAN SLOPE

Options: 0.125 PWM, 0.25 PWM, 0.5 PWM, 1 PWM, 2 PWM, 4 PWM, 8 PWM, 15 PWM

■ Boot Menu

Table 63 Boot Menu

BIOS SETUP UTILITY				
Main	Advanced	**Boot**	Security	Save & Exit
Boot Configuration				Enables/Disables Quiet Boot option
Quiet Boot		[Disabled]		
Fast Boot		[Disabled]		
Setup Prompt Timeout		1		
Bootup NumLock State		[On]		
Boot Option Priorities				
				→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
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Quiet Boot

Options: Disabled, Enabled

Fast Boot

Options: Disabled, Enabled

Bootup NumLock State

Options: On, Off

■ Security Menu

Table 64 Security Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	**Security**	Save & Exit
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights Administrator Password User Password				Set Setup Administrator Password → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

■ Save & Exit Menu

Table 65 Save & Exit Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	**Save & Exit**
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults Save as User Defaults Restore User Defaults Boot Override				Exit system setup after saving the changes. → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save ESC Exit
Version 2.00.1201. Copyright (C) 2009, American Megatrends, Inc.				

Save Changes and Exit

Exit system setup after saving the changes. Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select [Yes] to save changes and exit.

Discard Changes and Exit

Exit system setup without saving any changes. Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

Discard Changes

Discards changes done so far to any of the setup values. This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select [Yes] to discard any changes and load the previously saved values.

Load Optimal Defaults

Load Optimal Default values for all the setup values. This option allows you to load optimal default values for each of the parameters on the Setup menus, which will provide the best performance settings for your system. The F9 key can be used for this operation.

Load Failsafe Defaults

Load Optimal Default values for all the setup values. This option allows you to load failsafe default values for each of the parameters on the Setup menus, which will provide the most stable performance settings. The F8 key can be used for this operation.

Chapter 5

Driver Installation

If your KEMX-5000 does not come with an operating system pre-installed, you will need to install an operating system and the necessary drivers to operate it. After you have finished assembling your system and connected the appropriate power source, power it up using the power supply and install the desired operating system.
You can download the drivers for the KEMX-5000 from the Quanmax website at www.quanmax.com and install as instructed there. For other operating systems, please contact Quanmax.

NOTE

When the system reboots without connecting the CRT, there might be no image on screen when you insert the CRT/VGA cable. Please pressing <**Ctrl**>+<**Alt**>+<**F1**> simultaneously to show the image on screen.

Appendix A

DIO (Digital I/O) Sample Code

```
//=========================================
// KEMX-5000 DOS DIO sample program
//Please compile with Turbo C 3.0 to utilized the program
//=========================================

Int main()
{
Int RetVal;

////////// Write Digital Output //////////
// Set all output to 0
RetVal = inp(0x549);
RetVal = RetVal & 0xF2;
Outp(0x549,RetVal);    // DO0 is bit3
                       // DO1 is bit2
                       // DO2 is bit0
RetVal = inp(0x50F);
RetVal = RetVal & 0xFE;
Outp(0x50F,RetVal);    // DO3 is bit0

RetVal = inp(0x53B);
RetVal = RetVal & 0xF8;
Outp(0x53B,RetVal);    // DO4 is bit2
                       // DO5 is bit1
                       // DO6 is bit0

RetVal = inp(0x539);
RetVal = RetVal & 0xEF;
Outp(0x539,RetVal);    // DO7 is bit4


// Set all output to 1
RetVal = inp(0x549);
RetVal = RetVal | 0x0D;
Outp(0x549,RetVal);    // DO0 is bit3
                       // DO1 is bit2
                       // DO2 is bit0
RetVal = inp(0x50F);
RetVal = RetVal | 0x01;
Outp(0x50F,RetVal);    // DO3 is bit0
```

```
RetVal = inp(0x53B);
RetVal = RetVal | 0x07;
Outp(0x53B,RetVal);    // DO4 is bit2
                       // DO5 is bit1
                       // DO6 is bit0

RetVal = inp(0x539);
RetVal = RetVal | 0x10;
Outp(0x539,RetVal);    // DO7 is bit4


////////// Read Digital Input //////////
RetVal = inp(0xA00);     // DI[7:0] is bit[7:0]
}
```

Appendix B

WatchDog Timer Sample Code

```
//===========================================
// KEMX-5000 DOS Watchdog sample program
//Please compile with Turbo C 3.0 to utilized the program
//===========================================

#include <stdio.h>
#include <stdlib.h>

#define SMBus_Port 0x00000400 //"AMI BIOS" PCI-SMBus init address for
INTEL ICH CHIPSET
#define SMBus_ADDR 0x9c
#define WDT_Enable_Reg 0x01     //Bit 5 is the disable/enable WDT bit(0/1))
#define WDT_Time 0x35             //MSB to disable/enable countdown(0/1)
                                  //Rest seven bits to set the reset time in sec
                                  //e.g.   000_0000 --     0 sec
                                  //         000_0001 --     1 sec
                                  //         000_0002 --     2 sec
                                  //              .
                                  //              .
                                  //              .
                                  //         111_1111 -- 127 sec

/* =============== This Routine is Check the SMBus is Ready
=============== */
void Chk_SMBUS_Ready()
{

      int status=0;
      int flag=0;
      status=inp(SMBus_Port);
      while((status | status) != 0)
      {
            while((status & 0x04) != 0)
            {
                  flag=1;
                  outp(SMBus_Port,status);
                  delay(5);
```

```
            status=inp(SMBus_Port);

        }
        if(flag == 1)
        {
            printf("The Error Code is 0x00E0 !!! \n");
            break;
        }
        else
        {
            delay(25);
            outp(SMBus_Port,status);
        }
        status=inp(SMBus_Port);
    }
}

int WaitReady(int base)
{

    int STATUS;
    do{
        STATUS=inp(base);
    }while((STATUS&0x01)!=0);
    return 1;
}

int SMBUS_Read_Byte(int offset,int DEVID)
{

        int RetVal=0;
        outp(SMBus_Port,0x0fe);
        outp(SMBus_Port+0x04,DEVID+1);
        outp(SMBus_Port+0x03,offset+0);
        outp(SMBus_Port+0x02,0x48);
        delay(200);
        if(WaitReady(SMBus_Port))
        {
            RetVal=inp(SMBus_Port+0x05);
        }
        return (int)RetVal;
}

/* ================ This Routine is Write the Device Reg Value
================ */
void SMBUS_Write_Byte(int Dev_id,int Reg_index,int Value)
{
        outp(SMBus_Port+0x04,Dev_id);
        delay(5);
        Chk_SMBUS_Ready();
```

```
        outp(SMBus_Port+0x03,Reg_index);
        delay(5);
        outp(SMBus_Port+0x05,(Value & 0xFF));
        delay(5);
        outp(SMBus_Port+0x02,0x48);
        delay(25);
        Chk_SMBUS_Ready();
}

//function WDT
//This function is use to set WDT
//num is the reset time in sec(max 127 sec)

int WDT(int time)
{
    int current;
    printf("SMBUS enable WDT/n");
    current=SMBUS_Read_Byte(WDT_Enable_Reg,SMBus_ADDR);
    current=(current|0x20);
    SMBUS_Write_Byte(SMBus_ADDR,WDT_Enable_Reg,current);

    printf("SMBUS Set timer and enable countdown for WDT/n");
    current=SMBUS_Read_Byte(WDT_Time,SMBus_ADDR);
    time=(time|0x80);
    SMBUS_Write_Byte(SMBus_ADDR,WDT_Time,time);
    printf("SMBUS WDT will reset in 10 Sec\n");
    return 1;
}

int main(int argc)
{
    WDT(0x0a);//set the WDT to reset in 10 Sec
    return 1;
}
```